

**REMARKS**

Claims 1-22 are pending in this application. By this Amendment, claims 1-5, 13 and 14 are amended, and claim 22 is added. Reconsideration of the application is respectfully requested.

Applicant gratefully appreciates the indication that claims 12 and 13 are allowable.

The Office Action rejects claims 1-17 under 35 U.S.C. §112, second paragraph. Claims 1-5, 13 and 14 are amended to overcome the rejection of the claims. Moreover, with respect to claim 1, the feature of "the reflectivity adjustment layer" is clearly defined in the specification at, for example, page 4, lines 4-7 in paragraph [0014]. Also, with respect to claim 15, the feature of "a column-like portion" is clearly defined in the specification at, for example, paragraph [0052] and Fig. 1. Accordingly, withdrawal of the rejection of the claims under 35 U.S.C. §112, second paragraph, is respectfully requested.

The Office Action rejects claims 1-8, 10, 11 and 15 under 35 U.S.C. §102(b) over Johnson et al. (WO 02/45217); claims 1, 16 and 17 under 35 U.S.C. §102(b) over Scott (U.S. Patent No. 6,160,834); claim 9 under 35 U.S.C. §103(a) over Johnson in view of Sun (U.S. Patent No. 6,144,682) and claim 11 under 35 U.S.C. §103(a) over Johnson in view of Kondo (U.S. Patent No. 6,653,157). The rejections are respectfully traversed.

In particular, none of the applied references, alone or in combination, disclose or suggest a surface emitting semiconductor laser that includes a second mirror with an optical thickness of  $m_1$  times  $\lambda/2$  when a wavelength of the laser beam is  $\lambda$ , and an optical thickness of the reflectivity adjustment layer being  $(2m_2-1)$  times  $\lambda/4$ , as recited in independent claim 1.

Johnson teaches a system and method for providing a single mode VCSEL component that includes a semiconductor substrate having a lower surface and an upper surface, a bottom electrical contact, a lower mirror, an active region, an upper mirror wherein the upper mirror,

the active region and the lower mirror are interposed between the upper mirror and an equipotential layer and adapted to form therebetween an aperture of small dimension than the particular distance between the first and the second upper contacts (Abstract).

Scott teaches a vertical cavity surface emitting laser with variable tuning layer for adjusting the slope of the laser and method for manufacturing the same (Abstract).

Johnson teaches that the reflectivity adjustment layer 132 is equivalent to one-half the wavelength of the light source (Johnson, page 15, lines 4-6). Accordingly, Johnson does not disclose or suggest an optical thickness of the reflectivity adjustment layer being a multiple of one quarter of the wavelength of the light source, as recited in independent claim 1. Thus, Johnson fails to disclose or suggest the features of independent claim 1. Moreover, Scott does not teach that the reflectivity adjustment layer 10 is a multiple of one-half or of one-quarter of the wavelength, as recited in independent claim 1. Accordingly, Scott fails to disclose or suggest the features of independent claim 1.

In view of the foregoing, independent claim 1, and its dependent claims, are patentable over the applied references.

Claim 3 is also patentable over the applied references in view of the incorporation of the allowable subject matter of claim 12 into claim 3. Accordingly, withdrawal of the rejections of the claims under 35 U.S.C. §102(b) is respectfully requested.

Sun teaches a gallium arsenide semiconductor layer that surrounds a circular gallium arsenide semiconductor layer in a vertical cavity surface emitting laser (Abstract).

Kondo teaches a function block formed in such a way that the function block is fitted into concavity which is disposed on base body, and function block comprises optical element (Abstract).

Accordingly, neither Kondo nor Sun, alone or in combination, cure deficiencies of Johnson and Scott in disclosing or rendering obvious the features of independent claims 1 and

3. Thus, independent claims 1 and 3, and their dependent claims, are patentable over a combination of the applied references. Accordingly, withdrawal of the rejections of the claims under 35 U.S.C. §103(a) is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-22 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Tarik M. Nabi  
Registration No. 55,478

JAO:TMN/tje

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**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

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